

CLAIMS

1. Electrochemical display device capable of irreversibly switching from a first indicating state to a second indicating state, said device comprising:
 - a substrate (12) having an electrically insulating surface (16),
 - a first electrode (30) located on at least a part of said surface (16) of said substrate (12),
 - wherein said substrate (12), at least within said part of its surface (16) is light-transmissive, the transmissivity of the combination of said substrate (12) and said first electrode (30) being less than that of said part of said substrate (12),
 - a second electrode (32), and
 - an electrolytic liquid (28) arranged between and in electrical contact with said first and second electrodes (30,32),
 - wherein, upon application of an electrical voltage to said first and second electrodes (30,32), material of said first electrode (30) dissolves into said electrolytic liquid (28) exposing at least partially said substrate (12) thereby switching from the first indicating state to the second indicating state.
2. Electrochemical display device according to claim 1, further comprising several first electrodes (30) or several second electrodes (32) said first electrode or electrodes (30) being in electrical contact with said second electrode or electrodes (32) through the electrolytic liquid (28).

3. Electrochemical display device according to claim 1 or 2, further comprising at least one porous element (54) soaked with the electrolytic liquid (28) and arranged between said first and second electrodes (30,32).
4. Electrochemical display device according to claim 3, wherein the porous element (54) comprises a nonwoven layer.
5. Electrochemical display device according to any one of claims 1 to 4, wherein said substrate (12) comprises at least one electrically-conductive lead connected to said first electrode (30).
6. Electrochemical display device according to any one of claims 1 to 5, wherein said first electrode (30) comprises a metal layer (18) coated onto said substrate (12).
7. Electrochemical display device according to any one of claims 1 to 6, wherein said second electrode (32) is located on a further substrate (20).
8. Electrochemical display device according to any one of claims 1 to 7, wherein at least one of the substrates (12,20) comprises at least one electrically-conductive lead (42,44) and connected to the respective electrode (32).
9. Electrochemical display device according to claim 7 or 8, wherein at least one of the electrodes (30,32) comprises a metal layer (18) coated onto said respective substrate (12,20).

10. Electrochemical display device according to claim 9, wherein at least one of the substrates (12,20) comprises at least one recess (26) filled with the electrolytic liquid (28) and having side and bottom walls on at least one of which the respective electrode (32) is arranged.
11. Electrochemical display device according to any one of claims 1 to 10, wherein said substrate (12), or said further substrate (20) if provided, comprises a synthetic film material.
12. Electrochemical display device according to any one of claims 1 to 11, wherein said electrolytic liquid (28) is at least partially surrounded by an evaporation barrier.
13. Electrochemical display device according to any one of claims 1 to 12, wherein the electrolytic liquid (28) is coloured.
14. Electrochemical display device according to claim 1, comprising
 - an electrically-insulating first substrate layer (12) forming said substrate and metallized for providing said first electrode (30),
 - an electrically-insulating second substrate layer (20) metallized for providing said second electrode (32),
 - a porous pad (54) soaked with said electrolytic liquid (28) and located between said substrate layers (12,20), and
 - an electrically non-conductive seal (56) arranged around said porous pad (54),

- wherein said substrate layers (12,20) are spaced and electrically isolated from each other by said non-conductive seal (56).

15. Electrochemical display device according to claim 14, wherein said second substrate layer (20) comprises an electrically conductive path (44) insulated from said second electrode (32) and in electrical contact with said first electrode (30) of said first substrate layer (12).

16. Electrochemical display device according to claim 14 or 15, wherein

- said second substrate layer (20) is provided with several second electrodes (32),
- several porous pads (54) soaked with electrolytic liquid (28) are provide surrounded by said seal (56), and
- said first substrate layer (12) covers the arrangement of said porous pads (56).

17. Electrochemical display device according to claim 14 or 15, wherein

- said first substrate layer (12) is provided with several first electrodes (30),
- said porous pad (54) is arranged such that different parts thereof overlap with respective first electrodes (30), and
- said seal (56) surrounds each of said different parts of said porous pad (54).

18. Electrochemical display device according to any one of claims 14 to 17, wherein said seal (56) comprises bonding material such as adhesive material or heat seal material.

19. Electrochemical display device according to claim 1, wherein

- the substrate (12) comprises at least two parallel first channels (82) being open to one side of the substrate (12), each of said first channels (82) having a surface provided with a first electrode (30) extending along said first channel (82),
- a second substrate (20) comprises at least two parallel second channels (84) being open to one side of the second substrate (20) facing said first substrate (12), each of said second channels (48) having a surface provided with a second electrode (32) extending along said second channel (84),
- wherein said substrates (12,20) are arranged such that the first and second channels (82,84) are facing and crossing each other,
- wherein said first and second channels (82,84) are filled with the electrolytic liquid (28), and
- wherein, upon application of said voltage to one of said first electrodes (20) and one of said second electrodes (32), material of said one first electrode (30) dissolves into said electrolytic liquid (28) in the region in which the first associated channel (82) crosses the associated second channel (84).

20. Electrochemical display device according to any one of claims 1 to 18, wherein the distance between a first electrode (30) and a second electrode (32) varies.

21. Electrochemical display device according to claim 20, wherein at least one of the facing electrode surfaces (30,32) is arcuate, or the facing electrode surfaces

(30,32) are substantially planar and are inclined with respect to each other.